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**MANUFACTURE OF SEMICONDUCTOR DEVICE**

Patent Number: JP10256240  
Publication date: 1998-09-25  
Inventor(s): FUKAZAWA MASANAGA;; KADOMURA SHINGO;; FUKUDA  
Applicant(s): SONY CORP  
Requested Patent: ☐ JP10256240  
Application: JP19970158570 19970616  
Priority Number(s):  
IPC Classification: H01L21/3065; H01L21/768  
EC Classification:  
Equivalents:

**Abstract**

**PROBLEM TO BE SOLVED:** To form a connection hole in an interlayer insulating film by a dry etching process, using not only a general composition etching gas but also an etching gas containing no fluorocarbon-loosed gas.

**SOLUTION:** This method for manufacturing a semiconductor device includes a step of forming a connection hole 14 in an inter-layer insulating film by a dry etching process using an etching gas. In this case, a film 12 having a low dielectric constant is an insulating film which is made of a compound, having SiF or CF couplings in a chemical structural formula. Specifically, the compound may be SiOF, cyclic fluororesin siloxane copolymer or polyfluoroaryl ether. When such an insulating film employed, active species of F- or fluoroacarbon- boased molecules emitted from inside of the connection hole 24 of the inter-layer insulating film can cause an etching rate of the insulating film inside the hole 14 to be increased.

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**CLAIMS**

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[Claim(s)]

[Claim 1] the layer insulation film which consists of a compound which has SiF combination or CF combination in a chemical structure formula by the dry etching using etching gas -- connection -- the manufacture method of the semiconductor device characterized by having the process which forms a hole

[Claim 2] The compound which has SiF combination or CF combination in a chemical structure formula is the manufacture method of the semiconductor device according to claim 1 characterized by the ranges of specific inductive capacity being 1-4.

[Claim 3] the compound which has SiF combination or CF combination in a chemical structure formula -- under etching -- connection of a layer insulation film -- a hole -- the active species of the molecule of F emitted from inside, or a fluorocarbon system -- connection -- a hole -- the manufacture method of the semiconductor device according to claim 1 characterized by including F beyond the grade which can be made to accelerate etching of an inner insulator layer

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] the connection formed in the layer insulation film according to the example of this invention -- it is the outline cross section showing a hole

[Drawing 2] It is the outline cross section showing the structure of the sample used for the example of this invention.

[Drawing 3] the connection which tried to form in the layer insulation film used for comparison with the example of this invention -- it is the outline cross section showing a hole

[Description of Notations]

10 Si Substrate and 11 SiO<sub>2</sub> Layer and 12 Low Dielectric Constant Film and 13 Photoresist and 14 Connection -- Hole

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[Translation done.]

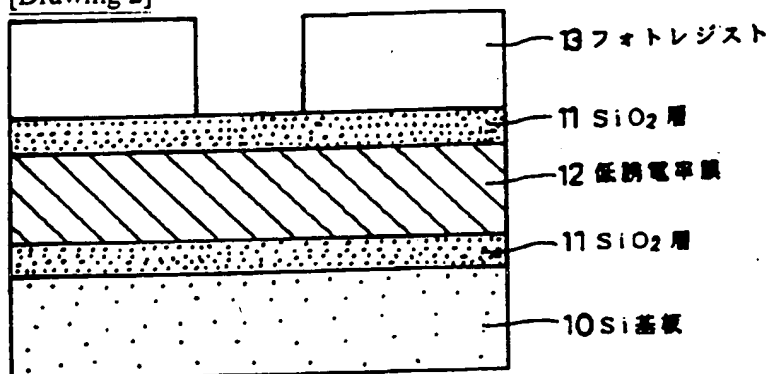
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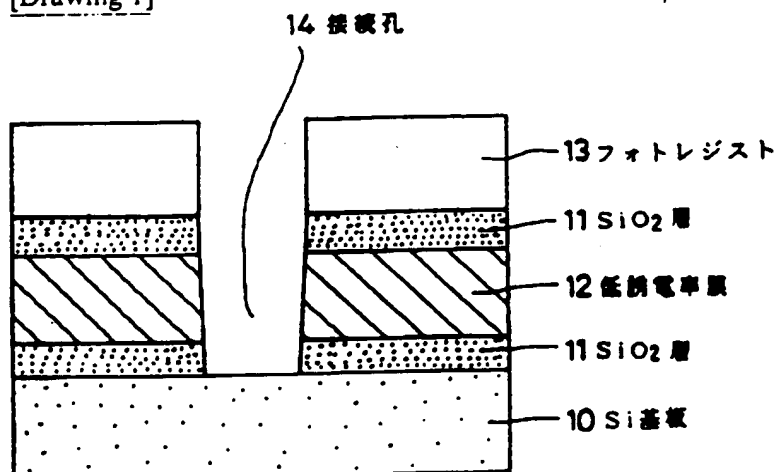
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DRAWINGS

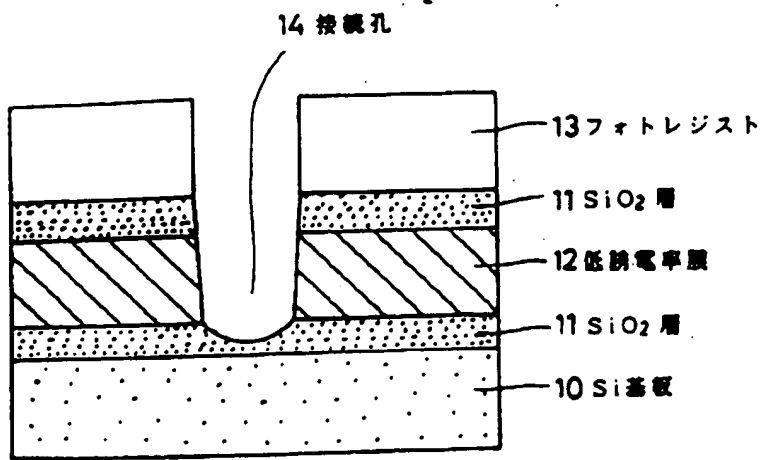
[Drawing 2]



[Drawing 1]



[Drawing 3]



[Translation done.]